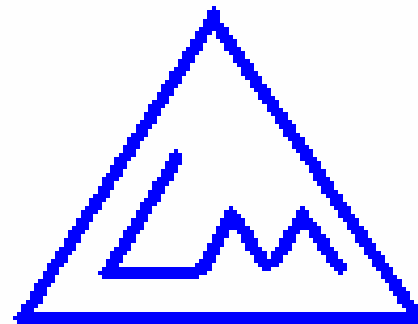




**ARCH COAL, INC.**



***LONE MOUNTAIN  
PROCESSING, INC.***

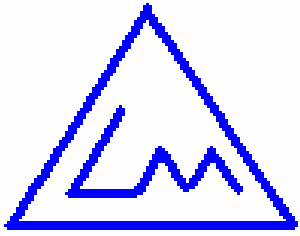
# **Lone Mountain Processing, Inc.**

**Presentation to Technical Study Panel**

**Utilization of Belt Air**

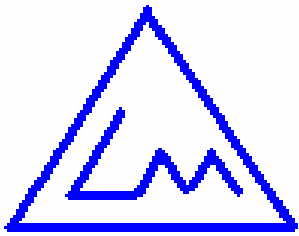
**June 20 – 21, 2007**

**Presented by : Patrick Leedy, PE  
Manager of Engineering**



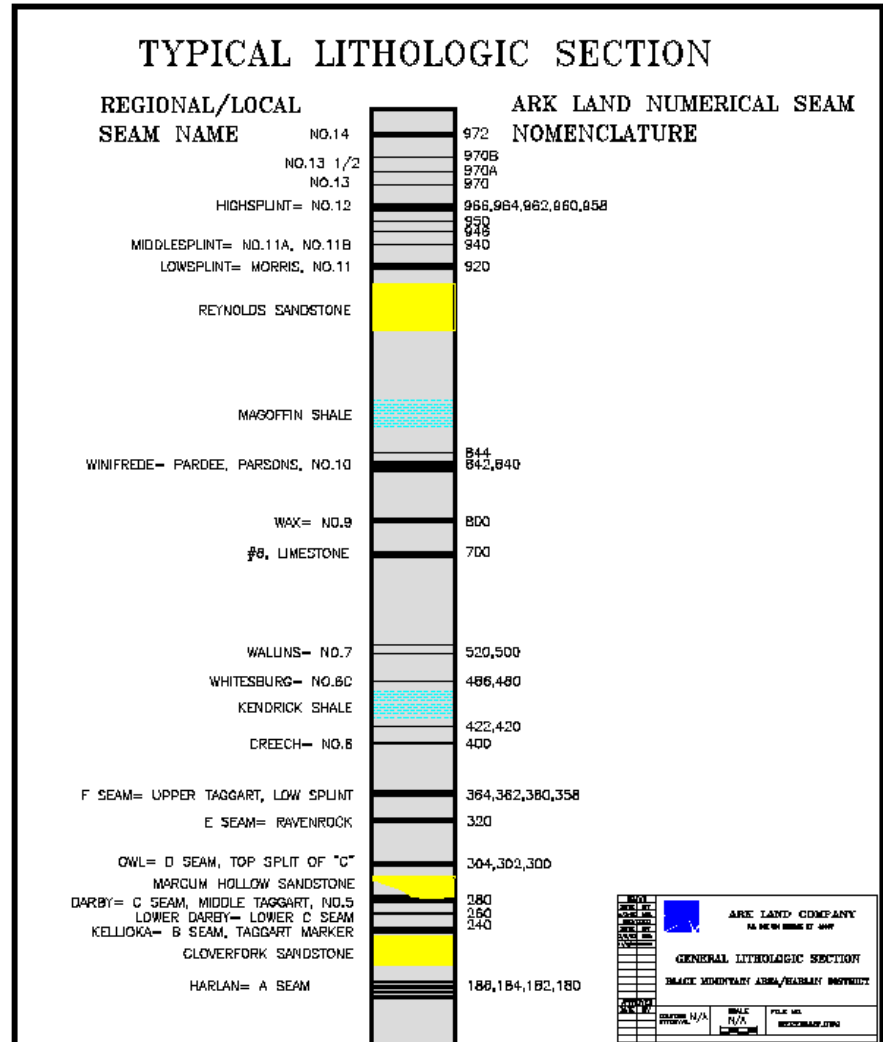
# **Lone Mountain Processing, Inc.**

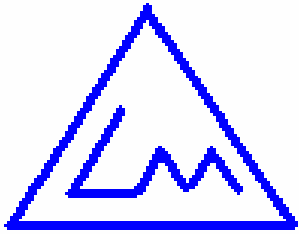
- **Division of Arch Coal, Inc.**
- **Operates 3 underground coal mines and 1 preparation plant and rail loadout.**
- **All 3 mines are continuous miner room & pillar operations.**
- **Five sections utilize continuous bridge haulage.**
- **Two sections utilize shuttle car haulage.**
- **Employment of 375 people from the area of eastern KY, southwest VA, & east TN.**



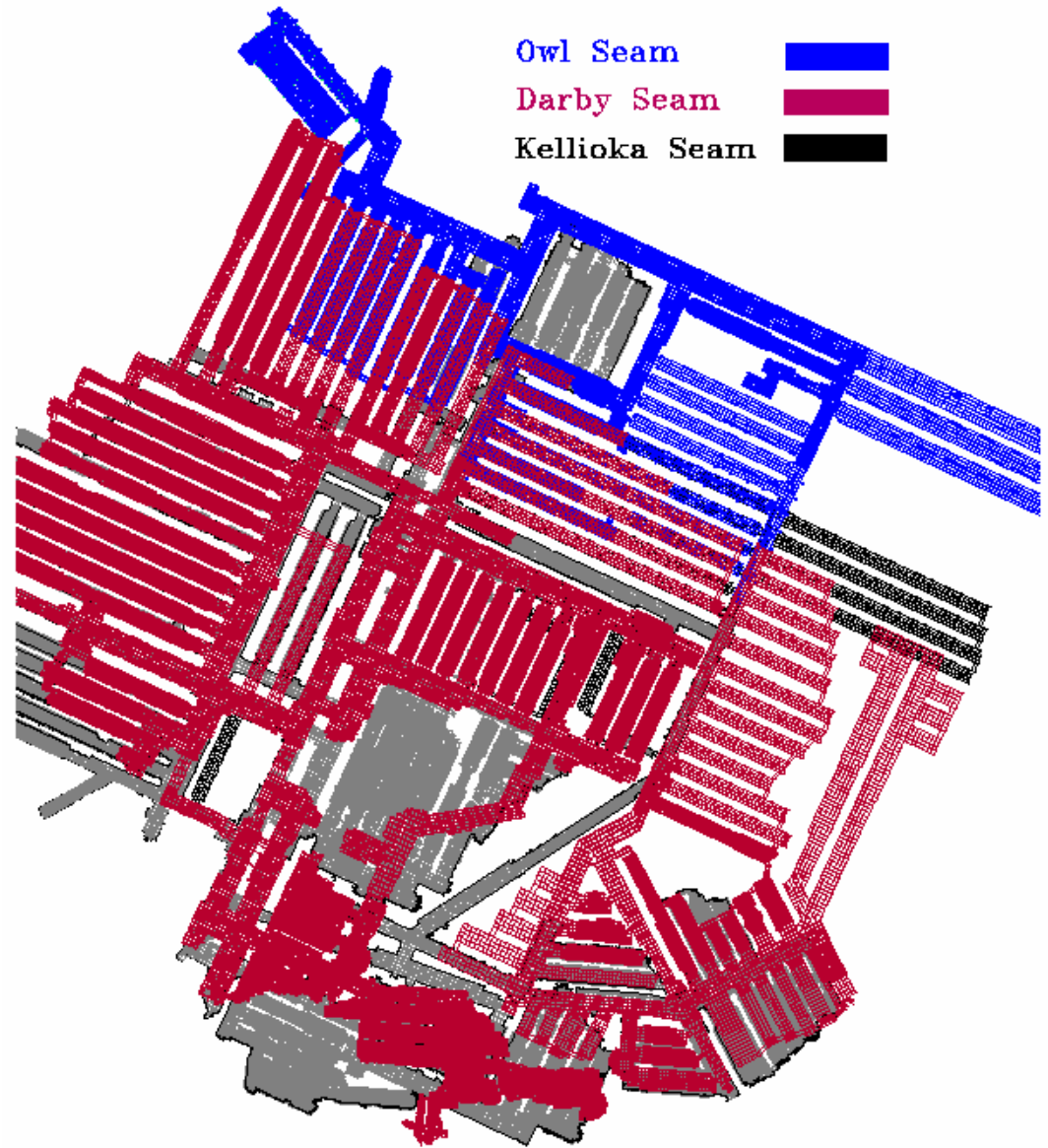
# Multi-Seam Operation

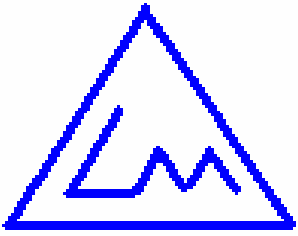
- Our three mines and a neighboring company's mine are operating in a multi-seam layout in the Owl, Darby, and Kellioka coal seams.
- Darby Fork mine – Darby seam
- Huff Creek mine – Kellioka seam
- Clover Fork mine – combined Owl & Darby seams
- Neighboring mine – Owl seam



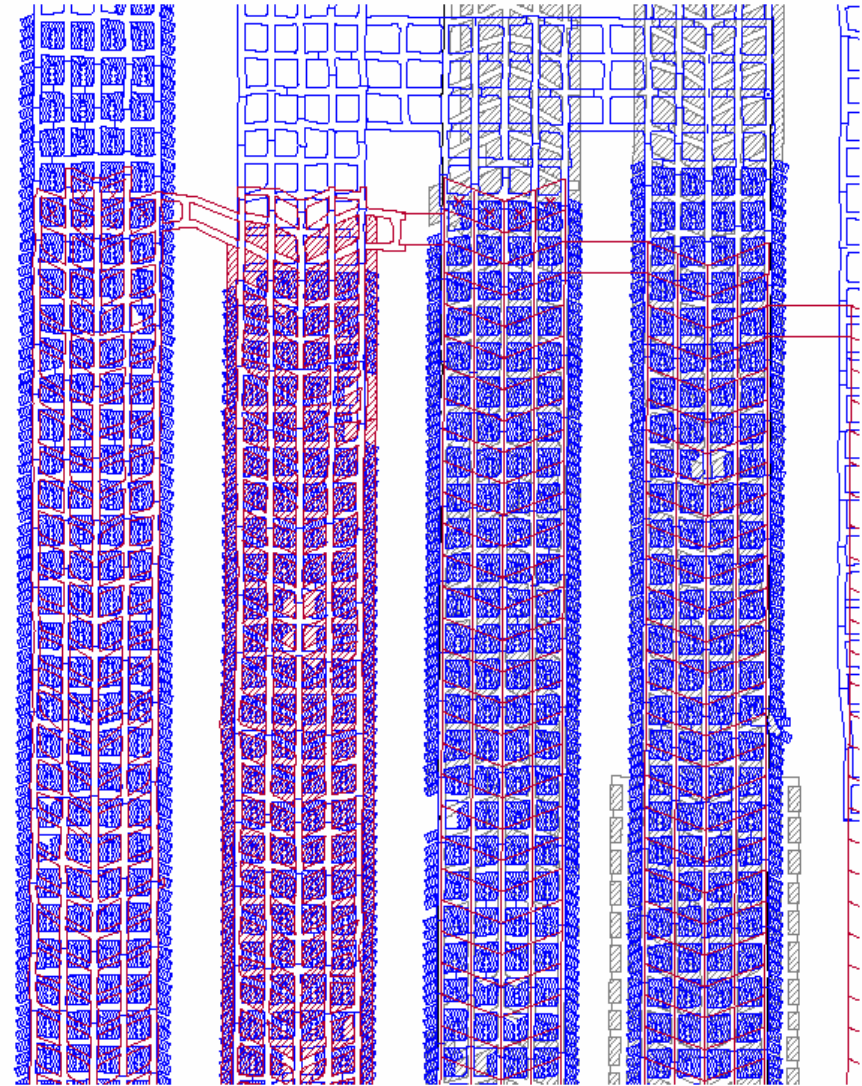


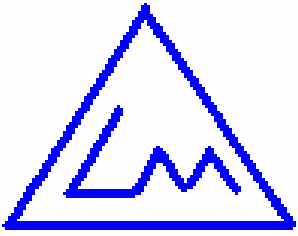
- In a multi-seam environment, our mining layout is constrained by previous mining above or below.





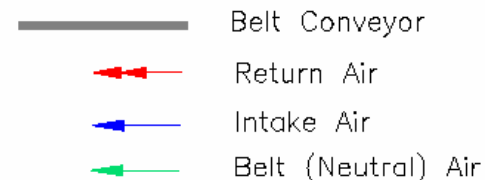
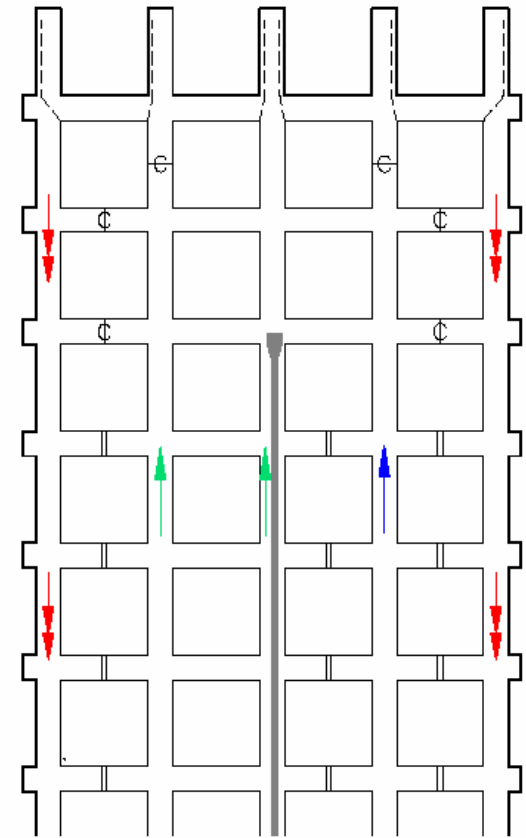
- Typical method of mining is to drive a 5-entry panel to its full length, then recover the pillars during retreat mining.
- Panels mined above or below must remain within the subsidence shadow or risk severe stresses from the barrier pillars left between panels.

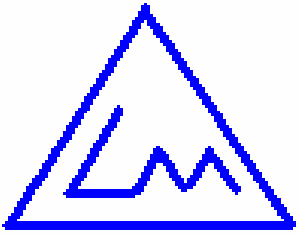




# Ventilation Constraints

- Both our Darby Fork and Huff Creek mines typically employ a 5-entry layout as shown.
- The continuous haulage bridge system does not allow for a common belt and roadway entry. This results in only 1 entry for intake air.

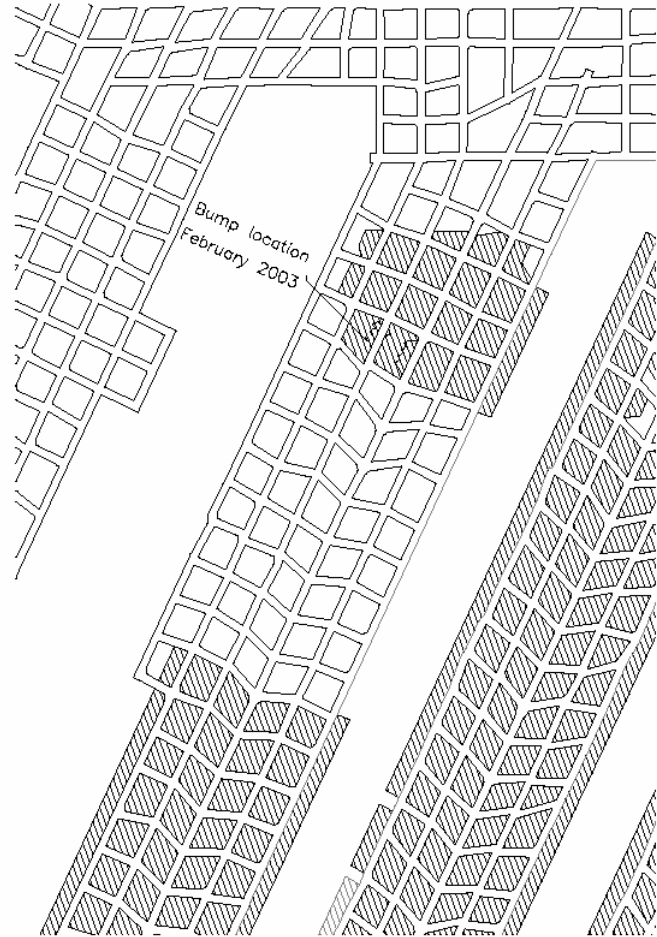




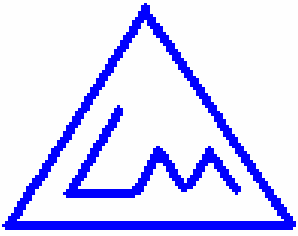
# Darby Fork Mine

- **Prone to bumps in certain areas.**

**Limiting panel width to 5 entries has been effective in controlling bump occurrence. Increasing the number of entries is not an option.**



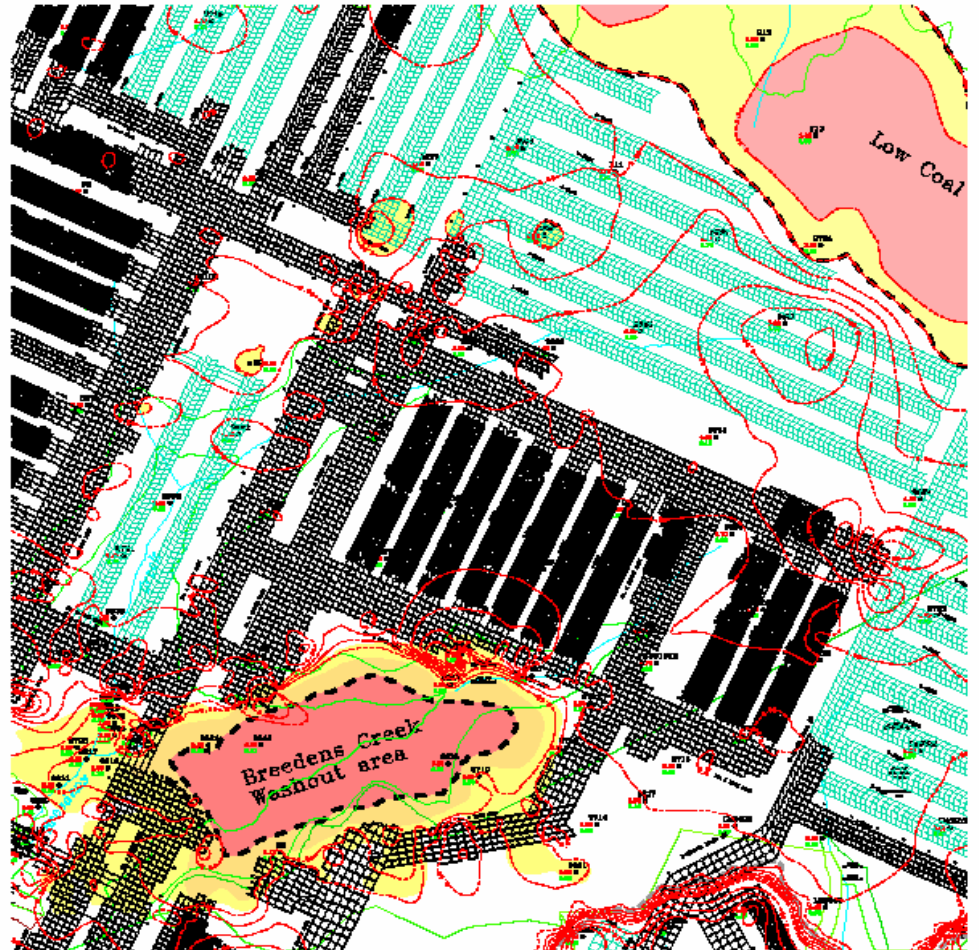




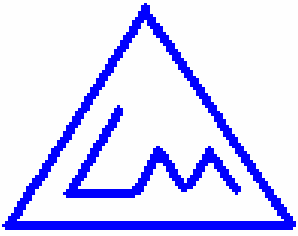
# Darby Fork Mine

- History of areas containing sandstone roof and reduced coal thickness.

**This lowers the mining height and causes additional resistance in our ventilation system.**

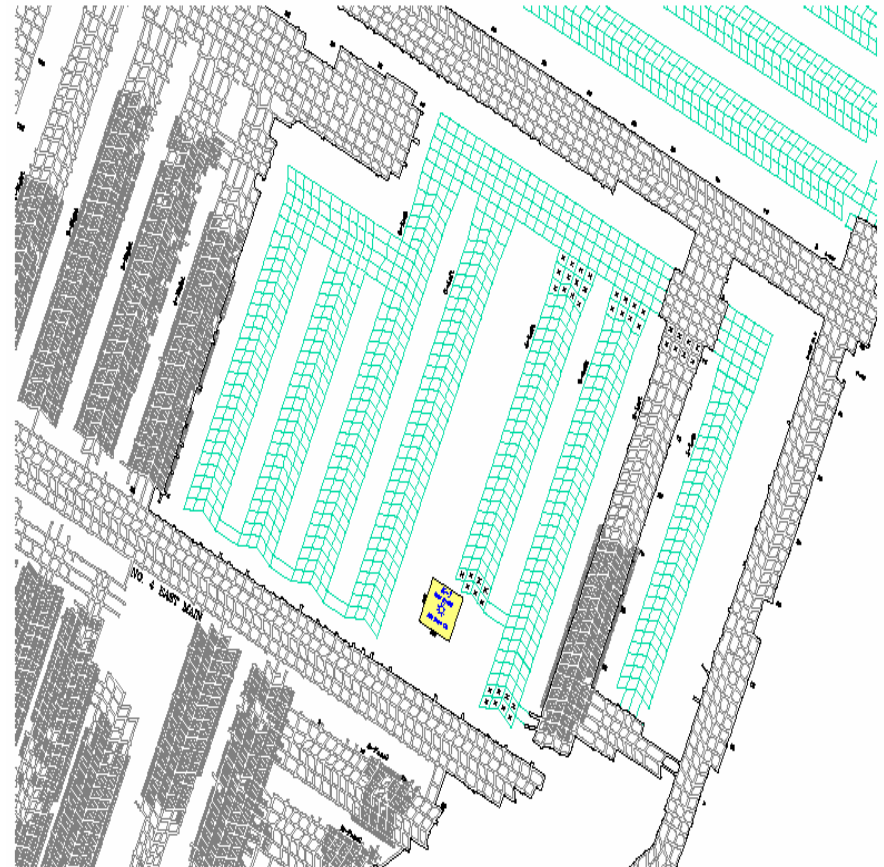


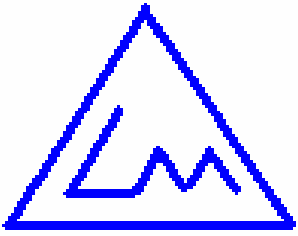




# Huff Creek Mine

- **Must remain in the footprint of the overlying Darby Fork workings. This necessitates using a 5-entry layout.**

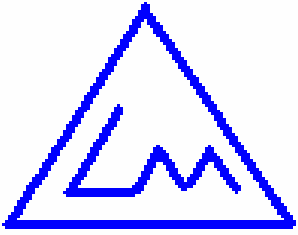




# Huff Creek Mine

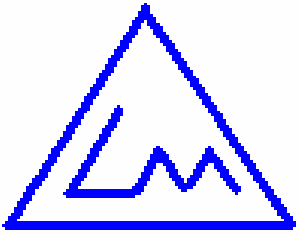
- Huff Creek Mine has a large area of sealed works and must sometimes skirt around them while staying in the footprint of Darby. This has created areas of 3-entry and 4-entry development and caused bottlenecks and additional resistance in the ventilation system.





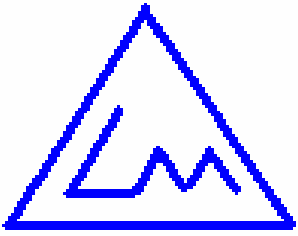
# Additional Restrictions

- **Both Huff Creek and Darby Fork mines have been in operation since the early 1990's. Their working sections are quite deep, located 4 to 5 miles from the slopes and shafts. This entry length further adds to the ventilation resistance at each mine.**



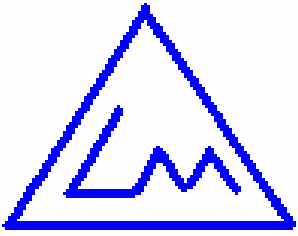
# Belt Air

- **Due to the resistance in the ventilation systems of Huff Creek and Darby Fork mines, belt air is used to ventilate the working sections at each mine. Provides additional entries for delivering air to the working faces.**
- **This in turn provides higher volumes of air at the working face to reduce dust levels and dilute any methane liberation.**



# Fire Prevention & Preparedness

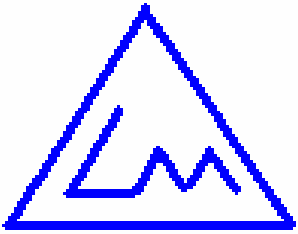
- **CO systems are operational and provide continual monitoring along the beltline of each mine.**
- **Pre-shift and on-shift examinations of belts**
- **Fire Suppression Systems at each drive**
- **Fire fighting boxes**
- **Servicing of Drives, Take-ups, Head and Tail pulleys**
- **Prompt clean-up of any coal spills**



- **Not all our mines use belt air.**

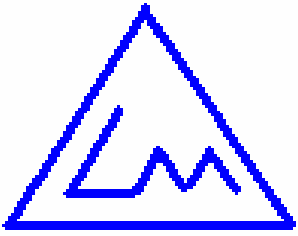
**The Clover Fork mine has a mining height of approximately 15' resulting in very low resistance to the ventilation system. Its mining faces are not as far in as the other mines. The additional air provided by belt air is not needed at this mine.**





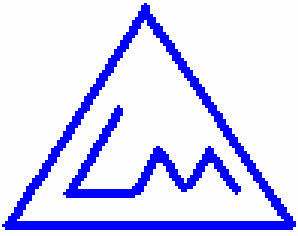
# Alternatives to Belt Air?

- **Main Fan Upgrades** – Each of the mines is ventilated by an 8' Jeffrey fan powered by a 500-hp motor. A fan upgrade would supply more air at the source. The problem is delivering it to the working sections.
- **Obstacles include:**
  - distance underground to working faces
  - numerous stoppings, overcasts, & associated leakage
  - limited number of entries
  - limited entry height in areas of sandstone
  - stoppings at the shaft or slope bottom that may not withstand the increased ventilation pressure



# Alternatives to Belt Air?

- **Additional Air Shafts – Another option would be to add multiple air shafts and fans to the back end of the property.**
- **Obstacles include:**
  - **much of the cover is 1500' to 2000'**
  - **much of the surface is remotely located**
  - **difficult to pre-select shaft locations due to ever-changing seam conditions and ability to mine to selected locations**



# Summary

- **Belt air is being used successfully to help ventilate the working faces of the Darby Fork & Huff Creek Mines.**
- **No other viable alternative exists to supply ample air to the sections.**
- **Through the use of a CO monitoring system and other fire prevention measures, the welfare of our personnel are protected.**
- **Highly recommend that belt air continue to be available to ventilate working faces.**